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ABSTRACT

New research programs on teaching have examined teacher thinking, reflective teaching, and the possibility of teachers using practical arguments in their teaching. The changes in educational research have their basis in social science conceptions of research, which have shifted through the years. The shift from logical positivism to a more ecologic naturalistic theory of research has led to an increased interest in teacher cognitive processes. This paper is based on the belief that teachers' beliefs, desires, and intentions are as equally important as their behaviors. It proceeds under the belief that the research perspective which takes these cognitive variables completely into account will be the one of most help to teachers and teacher education. The hypothesis of the paper is that the study of teacher cognitive processes, and especially the study of the use of practical arguments by teachers, can only now, as a result of the shifting social science conceptions, be seriously considered. (JD)

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**SHIFTING SOCIAL SCIENCE CONCEPTIONS OF RESEARCH:
THE POSSIBILITY OF THE PRACTICAL ARGUMENT
IN TEACHER EDUCATION**

by

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SHIFTING SOCIAL SCIENCE CONCEPTIONS OF RESEARCH: THE POSSIBILITY OF THE PRACTICAL ARGUMENT IN TEACHER EDUCATION

Educational research historically has included teachers as one of the variables in the process of teaching and learning. Research specifically on teaching has suggested methods and practices of teaching and how learning may best take place. Both types of research, however, are conspicuously absent of consideration of the teachers' own beliefs and desires. When teachers have been studied, it has almost always been in relation to how the teacher can affect the students. In the research thus far, it seems that teachers only have an interest to the researchers regarding their usefulness to education. Teachers have not been considered as people who have their own purposes in education.

The past decade in educational research has brought changes in this conception of teachers. Only recently have researchers recognized the telic nature of teaching, seeing teachers as persons with purposes, beliefs, and desires. New research programs on teaching have examined teacher thinking, reflective teaching, and the possibility of teachers using practical arguments in their teaching. All of these research programs demonstrate a stronger interest in the teacher himself/herself and his/her beliefs, desires, and intentions. This new focus in the study of teaching did not come about haphazardly. The research has followed the same general path as educational research overall.

Specifically, the changes in educational research have their basis in social science conceptions of research which have shifted through the years. There have been two basic but differing conceptions of social science research. One is a logical positivist type of conception, while the other is in

the interpretive perspective. These conceptions are about the possibilities of scientific research and the ability of social science research, and thus educational research, to fit the scientific model. Through an analysis of the progression of social science conceptions of research and the resulting research on teacher education, it can be seen that the shift from logical positivism through to a more ecologic, naturalistic theory of research has led to an increased interest in teacher cognitive processes.

Following the concern of Gary Fenstermacher regarding the importance of studying the intentional nature of teachers, the discussion in this paper will be based on the belief that teachers' beliefs, desires, and intentions are equally as important as their behaviors. Correspondingly, this paper will proceed under the belief that the research perspective which takes these completely into account will be the one of most help to teachers and to teacher education.

The hypothesis of this paper is that the study of teacher cognitive processes, and especially the study of the use of practical arguments by teachers, can only now, as a result of the shifting social science conceptions, be seriously considered.

Logical Positivism

The tenets of logical positivism, in a rough summary, include the search for lawlike statements which are universal and for explanations which are predictive. The belief is that there can be a model of scientific explanation. Further, it is a strong verificationist theory, with an emphasis on the search for objective claims which can be confirmed or verified. In fact, this verification is so important that an explanation or statement is considered to be "cognitively meaningless" unless it can, in principle, be verified. The only

variables which count are those which are measurable. For this reason, the tradition is sometimes called logical empiricism.

There is a long tradition of social science and educational research that is grounded in this conception. These educational researchers believe that education can fit into the scientific, logical positivist conception of the world. As a result, educational researchers in this tradition work as though their studies can, and in fact must, result in lawlike statements that are universal and predictive. Also, because of the emphasis on the measurable and verifiable, the researchers under this conception have chosen to focus only on behaviors that can be observed and measured. In fact, educational researchers, while acting under the conceptual framework of logical positivism, have done their research under the methodological framework of the behavioristic tradition of psychology. Thus, the quantitative research methods used by these educational researchers focus on observable behaviors. Their research involves setting up situations with the purpose of finding correlational relationships between directly observable variables. The goal is the discovery of explanations of behavior that are predictive of future educational situations.

Process-Product Research on Teaching

The research on teaching which comes directly from the logical positivist type of conception is the process-product research program. This research, following the behavioristic methods and the logical positivist conceptions, involves the search for correlative relationships between variables. The studies undertaken within the concept of this research program are searches for explanatory relationships between the two variables. In this process-product research, the two variables are those stated

in its description, those of process and product. The variables of process include teaching methods and techniques that actually occur in the school situation. The product variables describe the products of the educational system, such as the achievement of educational objectives. The studies in this tradition, following the logical positivist tradition, purported to find "lawlike connections" between teacher actions and student academic achievement. These findings were believed to give a straightforward connection between research and practice, thus solving one of the long-standing issues in the field of education, as well as in many such practical fields. This research program is also called "criterion of effectiveness" research because of its emphasis on the search for the most effective process variables that lead to the desired outcome.

Process-product research - criticisms. In order for this process-product focus to work, however, educational researchers had to leave out all references to telic concepts. For we will remember, behaviorism in psychology, from which quantitative research got its methods, was often done on non-human animals. And the natural sciences, from which the research takes its features for emulation, is about non-human objects and concepts. Following these underlying concepts, this type of research is undertaken with a non-telic presupposition, that man behaves with no intentional system. There was an attack within philosophy, however, on logical positivism, an attack which questioned the explanatory power of relationships between variables and further, which pointed out the long-held assumption of an end goal of human action.

The process-product research fits squarely into the logical positivist tradition, and the criticisms of this research already discussed also squarely apply to this research program. One of the main problems with the process-

product research in education is its lack of recognition of the intentional nature of human beings. The researchers in this tradition are interested in the relationships between teacher activities and student achievement. (Garrison and Macmillan, 1984) The concept of teachers and students as human beings is less emphasized than finding that ultimate relationship which will increase student academic achievement. What results is a mechanistic analysis of a purely non-mechanistic phenomenon. Without seeing teachers and students as human beings, but merely as variables, the beliefs, intentions, and emotions of these humans are simply ignored.

Other problems expressed by philosophers of education regarding the process-product, quantitative, behavioral approach to educational research is the lack of firm theoretical grounds for the selection of variables to study or for the interpretation of those findings. Each classroom situation involves many more variables than only the teacher's actions and the student's academic achievements. The Dunkin and Biddle model of the study of teaching (1974), from which the terms process and product can come directly, lists four variables involved in the study of teaching, of which, on further breakdown, there are actually twelve specific variables that can be examined. Under presage variables, there are teacher formative experiences, teacher training experiences, and teacher properties. Second, under context variables, there are pupil formative experiences, pupil properties, school and community contexts, and classroom contexts. Third, and seen as the only independent variable in the process-product research, are the process variables: teacher classroom behavior, pupil classroom behavior, and observable changes in pupil behavior. Finally, the product variables include immediate pupil growth and long-term pupil effects. Importantly, each of these variables are affected by at least one other variable, with the presage and context variables affecting

through time every other variable mentioned. Thus, education is not undertaken through only process and product variables.

Finally, there is a lack of theoretical grounds for the interpretation of feelings in the process-product research. The correlations between variables are sought in behaviors, without an overriding theory. When a process variable was seen to correlate well to a product variable, researchers in this positivist tradition took it to be lawlike, almost causal, without taking into account all of the other variables discussed above. The process-product research interpretation is entirely too mechanistic, too simplistic to account for the causal-like correlations that they claim to discover.

Process-product research - implications for teacher education. Such research, as shown by the popularity of the research program in previous years, can be a very useful one for the study of teaching. Specifically, it was translated into an extremely popular program for practice, the Competency-Based Teacher Education Program. Taken from process-product studies, those specific teacher behaviors which were found to be the most effective were separated and written into a list form, and teachers were held responsible for reaching each of the "competencies" on that list. The effect was that teacher education programs increasingly based their assessment of student teachers entirely upon this method of examining their teaching practices to see if they indeed had these competencies. A method of counting the frequencies of teacher behaviors evolved, with the idea that a frequency count would give a measurement of the effectiveness of that teacher being assessed.

In light of the discussion in this paper of the lack of concern by researchers for the intentional nature of teachers, the problem with this method of teacher education can be seen. For frequencies and lists of skills do not even allow for consideration of the fact that these teachers have beliefs,

desires, and emotions, some of which are unrelated to the teaching situation and unrelated to the goal of helping students reach educational objectives correctly. Thus, in the rush to find a better method of training and assessing pre-service teachers and in-service teachers, researchers in the process-product tradition have ignored many of the emotional concerns of the pre-service teacher.

Interpretive Tradition

A change in research method and focus began to occur upon the realization of some of these negative aspects of the logical positivist tradition. The new conception of educational research was based on the idea that the thoughts, intentions, expectations, and other cognitive processes of those involved in education are important. It is an interpretive, meaning-oriented perspective toward research which searches for the person's cognitive states. It attempts to discover the meanings that the participants put on the new circumstances which they encounter. It does not seek to find laws that are universal and generalizable to other educational situations. Educators in this interpretive research tradition do not adhere to the idea that laws can even be found. The variables they examine are in correspondence to each other only, with no assumption of causality or correlation involved.

The researcher in the interpretive tradition looks very closely at the morally and philosophically important goals in education. He is interested in how the students think as they individually hear and see the material. The interest lies not only in the academic performance of students, but also in their social development. Social development is often entitled the "hidden curriculum" of schooling, because of its implicitness in the schooling process. The qualitative, interpretive method of research used in the mediating process

research program is most appropriate for discovering the students' social and moral development. As this is not explicitly stated as a goal of education, it cannot be observed directly as a measurable variable, and is therefore observing something that process-product will not introduce.

Mediating Process Research on Teaching

With the emergence of the interpretive research program, the cognitive processes of individuals became more important and emphasized. This change of emphasis also followed the psychological tradition, as psychology was going through a major cognitive revolution. A new research program came into prominence: the Mediating-Process tradition. Mediating here means the middle ground between teacher input and student outcome. The goal of this research is to discover the cognitive processes that determine the students' understanding of the material given in instruction. As the result of not being able to discover directly the processes that occur cognitively within a person's mind, the researchers in this research program undertake interpretive, qualitative studies. Researchers often observe children themselves, or examine students' comments or writings, and attempt to interpret from these the cognitive processes that children go through during class time. This research program, pupil mediation, takes into account and corrects half of the problem that is seen with the process-product research. In this research program, the student's intentional system of beliefs and cognitive processes is taken into account; it is in fact the main goal of the research.

Mediating process - criticisms. But just as the process-product research program faced many criticisms, so the mediating-process program also has methodological and conceptual problems. In his review of the differing

research programs, Shulman discusses several of these problems (1986). The major methodological problem, which affects all interpretive, non-experimental research, is that the judgments made by outside observers cannot be always accepted as reliable. This has been found in studies in psychology and philosophy as well as in education.

Second, and just as important conceptually, Shulman writes that the mediators studied in the mediating-process research program "are treated almost like enduring states..." (1986, p. 18). Studies of the mediators tend to examine only those mediators, and rarely follow the results of the mediations through instructional situations. In other words, the mediators "are treated as ends in themselves" (p. 18). The criticism is a similar one to that of the process-product program: researchers in these traditions are concerned too singularly with one variable, to the extent of losing the connection between the other variables that may be involved. In process-product studies, that variable is the teacher's behavior, disregarding many other variables. Here, in mediating-process studies, that variable is the mediations of the students. The mediations are not followed through to the product in each case, thus also disregarding many other variables.

Mediating process research - implications for teacher education.

Regarding teacher education, this research program is introduced to students in their "Psychology of Education" courses, and it is especially emphasized in a developmental vein. Pre-service teachers are taught much about the child's psychological development and how the child perceives situations in the classroom.

But as was earlier stated, this only corrects half of the problem brought on by the process-product research. Now the intentional nature of students is a focal point, while teachers are still considered as mere variables. The

teacher's beliefs, desires, intentions, and emotions, are still of little or no concern to researchers.

Classroom Ecology Research on Teaching

A third major research program on teaching is ecologic, or naturalistic. While the first two research programs have their basis in psychology, classroom ecology research has more in common with other disciplines, such as sociology, anthropology, and linguistics. Research results in this tradition tend to be worded in an ethnographic style. It is descriptive, with interpretations of events and with the analyses of complex meanings. Consistent with the interpretive conception of research, Geertz writes that the purpose of classroom ecology research is "an interpretive one in search of meaning" (1973), as opposed to the purpose of process-product research: "an experimental science in search of law." (Shulman, 1986). This conceptual underlying is important to the present analysis. The difference between process-product and classroom ecology is not a simple difference between quantitative and qualitative methodology. The important difference comes from the conceptions of social science research, between the search for meaning and the search for a law of behavior, as was discussed extensively earlier in this paper.

In classroom ecology research, the main variable or point in question is the personal meaning that the participants put onto the situation. Whereas process-product researchers see the classroom as made up of discrete behaviors that can be reduced to individual instances, and mediating process researchers look at one side of an interaction, the classroom ecology researcher is concerned with the different meaning that each participant puts onto the events occurring in the classroom. This researcher views the

classroom as organized in a socially important environment, where each participant uses a different meaning for the events occurring in the classroom. It "focuses on mutual relations among environmental demands and human responses in natural classroom settings" (Doyle, p. 176). Examined by researchers in this tradition are the nature of classroom tasks, the structure of the environment of the classroom and the demands that environment places on participants in the classroom, and the varying mediating, cognitive processes of the students. The result is, in Doyle's words, "a general ecological framework for interpreting relationships between behavior and environment" (p. 176). These researchers recognize and look at the complexity of the classroom, its activities, its structure, and its interactive effect on its participants.

Classroom ecology - criticisms. Again, however, there are criticisms of this program of research. Methodologically, in many cases we find researchers generalizing to the entire educational system from just one study. Here, then, is a common criticism of each of the programs of educational research. Further, one of the previously discussed problems of non-experimental research is one which also applies here, is that the connection between the research results and the conclusions that are drawn are not based on theoretically sound ideas. The researchers have been shown to have jumped from a study result to a general conclusion about the entire educational system.

Conceptually, as Shulman writes, the criticism of the classroom ecology research is similar to that of the process-product and the mediating-process research: it also takes too few variables at a time to study (1986). In process-product research, it was a problem of only taking teacher behaviors. In mediating-process research, the problem was looking at specifically and

limited to specifically the mediating cognitive processes of students. And in this classroom ecology research, the problem is that even though researchers are looking at an entire classroom situation at one time, they still can focus only on one or two variables at a time.

Classroom ecology research - implications for teacher education. There does not appear to be a formal transmission of the findings of classroom ecology research in teacher education programs. Rather, the findings of these naturalistic observations and studies are included in discussions of the classroom and of teaching throughout each aspect of teacher education. These findings are discussed in methods classes, psychology classes, in classes in which pre-service teachers and teacher educators discuss student teaching, and in conferences between student teachers and supervisors. These discussions can be important to the pre-service teacher, as they emphasize the actual classroom environment, of which the student teacher often has no experience. Thus the studies undertaken in the tradition of classroom ecology can indeed be of good use to teacher education.

However, as with the other research programs, little is done within teacher education to encourage the pre-service teacher to examine his/her own desires and intentions within teaching. He/she is still given a set of findings to which he/she is expected to conform. Although the teacher is considered important in the educational process, his/her intentional nature is rarely or barely discussed.

Summary

In sum, the unit of analysis is different for these differing research programs: for the process-product researcher it is the behavior of the individual teacher, for the mediating-process researcher the meaningful unit

of analysis is the thought and cognitive processes of the individual student, and for the classroom ecology researcher it is the entire "ecosystem" (Shulman, 1986) of the teacher, the learner, the classroom, the school, and the community. Thus, we see how the differing conceptions of social science research, the original hypothesis, affects not only the research results, but also the very conceptions of what schooling should involve.

Teacher Cognitive Processes

In this discussion of research programs for the study of teaching, there is clearly a missing program: the study of teacher cognitive processes. For thus far in educational research, there has been the study of process variables (teacher classroom behavior), product variables (student academic achievement and growth), and context variables (student mediations, classroom and school contexts). A very important variable is missing, the first variable in the time-sequenced variables listed by Dunkin and Biddle, presage variables. Presage variables, again, are teacher formative experiences, teacher training experiences, and teacher properties. It seems obvious that the study of teaching must involve some research on the properties of the teacher herself. And for this paper, this variable is of utmost importance.

Only recently, a research tradition on teaching and teacher education has begun: the study of teacher cognitive processes. This new tradition completes the answer to the problems of logical positivism, as it studies variables beyond mere behavior by teachers. It includes the study of cognitions, intentions, desires, emotions, and actions of the teacher.

Teacher Thinking

Richard Shavelson (1983) has given the rationale for research on teacher thinking: "teachers are rational professionals who...make judgments and carry out decisions in an uncertain, complex environment...teacher's behavior is guided by their thoughts, judgments and decisions." Since these teacher cognitive variables occur prior to as well as during any teacher behaviors, it is reasonable to state that research on teacher cognitive processes should be examined completely as a retroactive beginning to the educational sequence.

The three basic cognitive processes studied by researchers in this relatively new research (I have refrained from titling it a research program because it does not appear to be a fully established and accepted program as of yet), have been teacher judgment and policy, problem-solving, and decision making. The studies in this research have focused on one, teacher thinking during lesson planning, in which researchers have had teachers think-aloud while discussing their lesson-planning. Second, they focus on interactive thought, where researchers commonly videotape an instructional session and asked teachers to describe their reasons for acting in certain manners during that class period, in a stimulated recall session. And third, the focus has been on models of teachers' judgments and problem-solving activities regarding their students, sometimes developing mathematical models with weights and regression equations.

This research on teacher thinking, obviously, has taken into account what teachers are thinking as they teach and prepare for teaching. Further, it looks at how teachers use the available information to make decisions about their actions. By applying this research technique in teacher education, pre-

service teachers can be encouraged to examine how they make decisions and how they use their judgments in teaching situations.

Practical Argument

Thomas Green (1976) and more recently Gary Fenstermacher (1987) have suggested that the way to improve teaching is by the use of the practical argument. While the development of reason has been a goal of education (Hirst, Scheffler), Green more specifically described as a goal the development of practical argument in education. Fenstermacher has recently expanded this idea to be a goal of teacher education, in which the teacher should work to have a fully developed practical argument in his/her actions. In this view, teacher educators "assist teachers in framing the practical arguments undergirding their actions, for many of these are not likely to be consciously known by the teacher" (Fenstermacher, Handbook). For the practical argument consists of a set of premises which lead to an intention to do an action. These premises include both statements of desire and statements of empirical evidence. In order to better understand their actions, teachers, in this view, must understand and be able to follow their premises which lead to the action. This idea of practical argument can be taken to be a microcosm of Aristotle's theory of practical reasoning overall, in which the person must take into account his/her beliefs and desires when preparing for an action. In this research perspective, then, understanding of the research on education (the empirical evidence-based premise) and of one's own desires (the desire-based premise) is what can be taught in teacher education. The teacher may then go on to improve the student's reasoning by applying his/her knowledge of the practical chain of reasoning to the students' own

reasoning, specifically by completing or adding to the student's range of premises for their actions.

At this point the extreme difference from the process-product, criterion-of-effectiveness research and emphasis can be seen. For while the conclusion of a practical argument makes possible an action, (it is a major controversy whether Aristotle meant that the conclusion to a practical argument was directly an action or just the intention to act, see Charles, 1984 for a thorough discussion of this controversy), the aspect of interest to researchers and teacher educators in this view is the teacher's premise, his/her desire, belief, or statement about his/her end goal. The idea of practical argument goes even further than the research on teacher thinking. Rather than beginning the research with the behavior that the teacher undertakes in the classroom, as the process-product focuses on, and rather even than looking at what the teacher thinks about as he/she makes his/her teaching decisions, this new research idea looks even more to the beginning of the teaching sequence, what the teacher believes, desires, and intends. This is the furthest step suggested in research on teaching for actually discovering what makes the teacher act in certain ways: the actual beliefs and desires behind the actions.

Regarding teacher education, this research has the much promise for the improvement of education. For before teachers can go into the schools to teach, they need to have an idea of their own beliefs, intentions, and rational processes regarding the teaching situation.

Conclusion

In review, the newest research being undertaken on teaching recognizes and considers as important the telic nature of teaching. As such,

these researchers look at the intentional aspects of the teaching act. They study the teacher himself/herself and the belief and desire structure and purposes that underlie the teacher's actions.

This inclusion of the study of the intentional nature of teachers in educational research has only begun very recently. In the past, the logical positivist conception of research directed the research done on teaching, which allowed only the search for explanations and laws about behavior. While this conception of research did not take into account the telic aspects of teaching, the next research conception which evolved was an interpretive perspective, which began to focus on meanings and cognitive processes used by students and teachers. Thus, it is only as a result of the shift in social science conceptions of research that the study of teacher cognitive processes can be undertaken. It is the conclusion of this paper that the move to this emphasis is a healthy one for teachers and teacher education.

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